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Title of the Invention: Offset-type Printing Machine comprising Perforating Device and Numbering Device

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1. TITLE OF THE INVENTION

Offset-type printing machine comprising perforating device and numbering device

2. SCOPE OF CLAIM OF THE UTILITY MODEL

A printing machine, which simultaneously performs offset-type printing, numbering printing, and longitudinal perforating and transverse perforating etc., wherein an offset-type printing device, a numbering printing device, a longitudinal perforating device and transverse perforating device are unitized so as to assembly each of these devices, an impression drum and a transfer cylinder of each unit uses a double-diameter drum, an offset-type printing unit consists of two types of offset-type printing units, that is, an offset-type printing unit A with a swing mechanism and an offset-type printing unit B, and each of a numbering printing device and a longitudinal perforating device are unitized to be divided into an upper one and a lower one, and the lower one is unitized as three types of unit, that is, an impression unit K with a swing mechanism, an impression unit L, and an impression unit M, and the upper one is unitized as two types of unit, that is, a numbering unit P and a longitudinal and transverse drum unit Q, and therefore the upper one and the lower unit are five type of units, and two type of units, that

is, a double-color numbering printing unit D with delivery mechanism, and a reverse numbering printing and longitudinal and transverse perforating unit C are added, and various combinations of nine type of each unit allow any arbitrary combination of printings.

3. DETAILED DESCRIPTION OF THE INVENTION

[The technical field and the object of the invention]

The present invention relates to a printing machine, which simultaneously performs offset-type printing, numbering printing, and longitudinal perforating and transverse perforating, wherein numbering printing devices can be added, and the order of the step of numbering and the step of longitudinal and transverse perforating can be reversed, and a reverse numbering printing can be achieved.

[Prior art and problem to be solved]

One example of a main part of a prior art printing machine, which simultaneously performs offset-type printing, numbering printing, and longitudinal perforating and transverse perforating, is that an offset printing section (a) with swing mechanism is directly connected to a longitudinal and transverse perforating section (b), and is fixed to a numbering printing section (c) with delivery mechanism, as shown in Fig. 1. However, in the prior art printing machine, it is not possible to change the order of step of longitudinal and transverse perforating and the step of numbering, and it is not possible to add numbering printing devices, and the prior art printing machine is inconvenient to use.

[Constitution and effect of the invention]

According to the present invention, a printing machine is unitized in order to divide and assemble a plurality of elements of the printing machine. These elements are divided in the front-back direction and the vertical direction. According to need, each unit is assembled to be coupled to each other so that any combination can be achieved.

For example, as shown in Fig. 1, the printing machine is divided into three units, that is, a front-side offset-type

printing part (a), an intermediate-side perforating process part (b), and a rear-side number printing part (c). Furthermore, the intermediate-side perforating process part (b) and the rear-side number printing part (c) are divided into an upper part and a lower part, respectively. A plurality of types of upper part and a plurality of lower parts are prepared so that any combination of the upper part and the lower part can be achieved. A user can combine the units freely to perforate and print sheets simultaneously, according to need.

[Embodiments]

Figs. 2 to 9 are various views showing a front section, an intermediate section and a rear section of a printing machine made by using each of the above units or combining an upper one of the above units with a lower one of the above units. Firstly, an offset printing section is used as two types of offset printing sections, that is, an offset printing section with swing mechanism S of Fig. 2 (A) and an offset printing section without swing mechanism of Fig. 3 (B). The offset printing section of Fig. 2 (A) is used as a printing device front section, and the offset printing section of Fig. 3 (B) is used as a printing device intermediate section. In the drawings, reference symbol s indicates a paper feeding swing device, reference numeral 1 indicates a transfer drum, reference numeral 2 indicates a double-diameter pressure drum, reference numeral 3 indicates a blanket drum, reference numeral 4 indicates a printing drum, reference numeral 5 indicates an inker, reference numeral 6 indicates a water feeding device, and reference numeral 7 indicates a double-diameter intermediate drum.

A longitudinal and transverse perforating section and a numbering printing section are divided into an upper one and a lower one, and the upper one is used as two type of units, that is, P section of Fig. 4 (numbering section) and Q section of Fig. 5 (perforating section). In the drawings, the upper and lower division parts are shown in a dot line. The lower unit is used as three type of units, that is, K section of Figs. 4 and 5, L section of Figs. 6 and 7, and M section of Figs. 8 and 9. The K unit has a swing device S, and constitutes a front part

of a printing machine together with the upper unit. L unit forms the intermediate part of a printing machine, and M unit comprises a delivery device and forms the rear part of a printing machine.

In Figs. 4 to 7, each of reference numerals s, 1, 2, 5 and 7 represent a swing device, a transfer drum, an inker, and a double-diameter pressure drum, an inker, and a double-diameter intermediate drum. Reference numeral 8 represents a numbering drum, reference numeral 9 represents a longitudinal perforating device, and reference numeral 10 represents a transverse perforating device.

The same also applies to Figs. 8 and 9, and reference numeral 10 represents a transverse perforating device.

The type of combination of divided unit P, Q and divided unit K, L, M is six patterns, that is, P and K (Fig. 4); P and L (Fig. 6); P and M (Fig. 8); Q and K (Fig. 5); Q and L (Fig. 7); and Q and M (Fig. 9).

Figs. 10 (C) and 11 (D) show a special composite unit, Fig. 10 (C) shows a swing device s, longitudinal and transverse perforating devices 9, 10, reverse printing double-diameter pressure drum 2', and reverse numbering drum 8, and these elements are used in the front part of a printing machine and can perforate and reverse number.

Fig. 11 (D) shows a numbering drum 8, a second numbering drum 8' and a paper ejecting drum 11, these elements are used in the rear part of a printing machine and can print two different colored numbers.

A basic unit of the present invention consists of nine elements: two offset units, five units which are divided into an upper one and a lower one, and two special units.

Using the above unit of each figure or combined unit, the following combined type of printing methods are obtained.

Front part	Intermediate part type	Rear part type	Total	Total is thirty types
Fig. 2 (A)	Fig. 3 (B) x Integral multiple of unit Fig. 6 (P) (L) x Integral multiple of unit Fig. 7 (Q) (L) x	Fig. 8 (P) (M) Fig. 9 (Q) (M) Fig. 11	9	

	Integral multiple of unit	(D)		
Fig. 4 (P) (K)	Ditto	Ditto	9	
	Ditto	Ditto		
	Ditto	Ditto		
Fig. 5 (Q) (K)	Ditto	Ditto	6	
	Ditto	Ditto		
Fig. 10 (C)	Ditto	Ditto	6	
	Ditto	Ditto		
	Ditto	Ditto		

Accordingly, since nine basic units are provided in the present embodiment, thirty types of each printing methods can be obtained. If a special composite unit is added conveniently, more number of printing methods can be achieved.

A typical example of combination used actually is as follows.

A combination method is shown by reference numerals of Figures.

2 x 7 x 11 Offset printing,

Longitudinal and transverse perforating, and
Numbering 2

10 x 7 x 11 Reverse Numbering,

Longitudinal and transverse perforating, and
Numbering 2

5 x 6 x 6 x 8

Longitudinal and transverse perforating, and
Numbering 3

4 x 6 x 6 x 9

Numbering 3, and
Longitudinal and transverse perforating

2 x 3 x 7 x 11

Offset printing 2,
Longitudinal and transverse perforating, and
Numbering 2

5 x 11

Longitudinal and transverse perforating, and
Numbering 2

4. ADVANTAGEOUS EFFECT OF THE INVENTION

According to the present invention, by preparing few type

of basic units, many type of arbitrary combination of printings are obtained and substantial saving of costs and installation place. Moreover, in a mechanical operation, by using double-diameter drum as an intermediate drum and a pressure drum for longitudinal and transverse perforating devices which are independent units, large working space is ensured, the operability is good, and therefore working is facilitated.

Furthermore, since the device is unitized, user can change the increase or degrees of the number of colors, and user can change the order of the step of perforating or numbering with respect to the step of offset printing.

5. BRIEF EXPLANATION OF THE DRAWINGS

Fig. 1 shows a prior art device, and Figs 2 to 11 show each unit of a printing machine of the present invention.

- A ... Offset-type printing unit (with a swing mechanism)
- B ... Offset-type printing unit (without a swing mechanism)
- C ... Composite printing unit
- D ... Composite printing unit
- P ... numbering unit
- Q ... Longitudinal and transverse drum unit
- K ... Front constitution unit (lower portion)
- L ... Intermediate constitution unit (lower portion)
- M ... Rear constitution unit (lower portion)
- 1 ... transfer drum
- 2 ... double-diameter pressure drum
- 3 ... blanket drum
- 4 ... printing drum
- 5 ... inker
- 6 ... water feeding device
- 7 ... double-diameter intermediate drum
- 8 ... numbering drum
- 9 ... longitudinal perforating device
- 10 ... transverse perforating device
- 11 ... paper ejecting drum